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Management and sustainability of external debt: A focus on the emerging economies of Africa

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Abstract

African countries have had the notoriety of being characterized by unsustainable external debt. Despite several announced intents by world development agencies to reverse this trend, there appears to be only minimal progress. This paper points to failure to determine appropriate levels of sustainable external debt, inadequate effective governance infrastructure, and ineffective management of external shocks, as important reasons why Africa's external debt problems have persisted. We derive African-relevant thresholds for sustainable external debt, and highlight quantifiable improvements African countries can experience if they were to adopt better governance infrastructures and effective management of external shocks.

JEL classification: G18; F34; F47; O16

Keywords: Africa; Sub-Saharan Africa; Sustainable external debt; Governance infrastructure; External shock management

1. Introduction

Since the inception of multinational debt crisis in the early 1980s, African countries' external debt has remained unsustainable,[1] with these countries sadly bearing the attendant welfare reducing effects of unsustainable indebtedness (Cohen, 1993; Fosu, 1999; Iyoha, 1999; Gumisai, 2001; Boyce and Ndikumana, 2001; Ndikumana and Boyce, 2003; Ndikumana, 2004; Loser, 2004). Whilst grappling with this albatross, most of these countries have severally rescheduled their external debts which, in turn, worsened their external debt problems. In fact, Sub-Saharan African countries started rescheduling their debts as from 1989. In 1989, the total amount of debt rescheduled was US$13.94 billion, by 2000 it had risen to US$22.63 billion. It declined to US$1.03 billion in 2007. On average, between 1989 and 2007, the region's total external debt rescheduled was US$5.14 billion.

However, researchers (e.g., Claessens, 1990; Semmler and Sieveking, 2000; Easterly, 2002; Cassimon and Vaessen, 2007; Ferrarini, 2008) provide evidence that external borrowing can aid economic growth and development when used productively and at sustainable levels. Examples of countries that have used debt in sustainable versus unsustainable ways can be found in South Korea versus Indonesia in East Asia, Chile and Brazil versus Argentina in South America, and Ghana versus Zambia in Africa. Further, recent evidence suggests that countries formerly characterized by unsustainable debt can dispense of the albatross and move their economy forward, as Indonesia appears to be doing.

Very few African countries known to have been characterized by unsustainable external debt has been decidedly unshackled from its burden. This view is substantiated by Yang and Nyberg (2009) who show that long term debt sustainability remains a challenge for post completion point, highly indebted

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[1] External debt sustainability refers to the ability of a country to meet the current and future external debt obligations of both private and public sectors without: running into arrears, recourse to debt-rescheduling, and a need for balance-of-payments adjustment (Akyüz, 2007; UNCTAD/UNDP, 1996).

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poor countries (HIPCs).[2] This persistence of unsustainable indebtedness despite the attainment of this "milestone" is attributable to structural vulnerabilities of these economies, such as a narrow export base, weak institutions and governance, poor domestic resource mobilization, and inadequate debt management capacity. The pertinent question, which is the primary concern in this study, is why unsustainable external debt and its consequences have remained seemingly intractable among African seemingly ever emerging economies?

We argue that three main factors are responsible for this persistent undesirable situation. First, it is fundamental to get right what constitutes sustainable debt for a country before any attempt to reverse its debt level to such a threshold can bear the desired result. It does appear that the appropriate thresholds for African countries have not been ascertained (Gumisai, 2001; Easterly, 2005; Caliari, 2006; IMF and World Bank, 2006; Manasse and Roubini, 2009). Second, African countries appear not to have taken fully into cognizance the linkages between successful management of external debt and effective management of external shocks, such as world commodity price and interest rates vacillation. Senhadji (1997, 2003) shows that linkages between these two macro-management imperatives, are largely responsible for the accumulation of unsustainable indebtedness in small open economies, such as those in Africa. Third, political will and effective governance infrastructures are vital for both ascertaining sustainable debt thresholds and implementing policies that would move and keep countries at such desirable levels. African countries appear not to be exemplary in this respect (Mwega and Rwegasira, 2003; Ndikumana and Boyce, 1998; Kaufmann et al., 2008).

This paper, therefore, sets out to derive sustainable external debt thresholds that would be more appropriate for African economies. It identifies from extant empirical and theoretical guides, external shocks that are characteristically linked to external debt accumulation and its attendant difficulties. Importantly, the paper provides concrete measures of debt management gains that are possible were African countries to adopt, from other regions of emerging economies, best practices in debt relevant macroeconomic management and governance infrastructure provisioning.

The empirical results of this paper provide encouraging signs on some effective ways of eventually aiding African countries to achieve manageable external debt levels. Derived sustainable external debt thresholds are substantially below levels that have hitherto been recommended by world development agencies, such as IMF and the World Bank (particularly via the highly indebted poor countries initiative – HIPC): that is, debt to GDP ratio of 80%, debt to exports ratio of 60% and short-term debt to reserves ratio of 80% are less than corresponding ratios of 250%, 150% and 130%, respectively, recommended by the World Bank for HIPCs. Levels of external debt above these thresholds identified and suggested by this current study tend to yield negative economic growth for African countries. Improving African countries' governance infrastructures (political and legal) and macro-management practices to the standards of East Asian emerging economies would see African countries reduce their external debt levels considerably. Similar gains would accrue were African countries to adopt governance best practices of South American emerging economies, but not their macroeconomic management style.

Next, Section 2 presents both theoretical and empirical backgrounds around the issue of sustainable external indebtedness; this is followed by the method adopted to empirically estimate, what in this study, is considered more African-relevant external debt thresholds. Section 3 extends results from the thresholds determination exercise to the effects of policy and governance infrastructures on external debt management. Here some concrete (measurable) gains from adopting better macro-management practices and effective governance infrastructures are computed. Finally, Section 4 concludes the paper by recapping both the essence and findings of the study.

2. Thresholds for sustainable debt

The theoretical literature suggests that foreign borrowing has a positive impact on the investment and growth up to a certain threshold; beyond this threshold, however, its impact is adverse, giving rise to a "Laffer curve" type relationship between external debt, on the one hand, and investment and per capita income growth on the other (Claessens, 1990; Semmler and Sieveking, 2000). According to the IMF (2000), there are various indicators for determining a sustainable level of external debt. These indicators are primarily in the form of ratios and they aid policy makers in their external debt management duties. These indicators can be thought of as measures of the country's "solvency[3]" in that they consider the stock of debt at a certain time in relation to the country's ability to generate resources to repay the outstanding balance. Examples of such indicators of debt management capacity include the debt to GDP ratio, foreign debt to exports ratio, government debt to current fiscal revenue ratio, share of foreign debt to total debt and short-term debt to total debt.

The IMF (2000) also notes that a second set of indicators focuses on the short-term liquidity requirements of the country with respect to its debt service obligations.[4] These indicators are not only useful early-warning signs of debt service problems, but they also highlight the impact of the inter-temporal trade-offs arising from past borrowing decisions. Examples of liquidity monitoring indicators include the debt service to GDP ratio, external debt service to exports ratio and government debt

[2] Note that as of end of September 2008, 23 countries had reached the HIPC completion point, and many of these countries are in Africa (most of which are also in this study's sample). Post completion point countries are those that have fulfilled all the reforms that are required for full external debt cancellation.

[3] IMF (2000) defines solvency as the country's ability to discharge its external obligations on a continuing basis. If debt can be rolled over at maturity, countries are solvent and if the present value of net interest payments does not exceed the present value of current account inflows.

[4] IMF (2000) posits that lliquidity problems arise when a shortage of liquid assets affects the ability of an economy to discharge its immediate external obligations. Liquidity problems always emerge in circumstances that give rise to insolvency or unwillingness to pay.

service to current fiscal revenue ratio. The next set of indicators are more forward looking as they point out how the debt burden will evolve over time, given the current stock of debt and average interest rate. These dynamic ratios show how the debt burden ratios would change in the absence of repayments or new disbursements, indicating the stability of the debt burden. An example of a dynamic debt management ratio is the ratio of the average interest rate on outstanding debt to the growth rate of nominal GDP.

External debt sustainability can also be measured by the current account balance (IMF, 2000). If deficits persist, the country's external position may eventually become unsustainable as reflected by a rising ratio of external debt to GDP. In other words, financing of continually large current account deficits by the issuance of debts leads to an increasing debt burden. This undermines solvency and leads to external vulnerability from a liquidity perspective, owing to the need to repay large amounts of debt periodically (e.g., monthly, quarterly or bi-annually).

Different thresholds for external debt sustainability have so far been computed. The threshold for debt sustainability under the HIPC initiative is, for example, pegged at a debt to export ratio of 150% and a debt to GNI ratio of 250%. In their empirical study, Pattillo et al. (2002) compute debt thresholds by assuming that the HIPC initiative will halve countries' debt levels. They use year 2000's debt ratios as their benchmark values, and find that debt negatively affects per capita growth when debt-to-exports ratio is 160–170% and debt-to-GDP ratio is 35–40%.

More recently, Manasse and Roubini (2009) suggest that a fuller set of predictor variables for external debt management include, among others, the total external debt to GDP ratio, short-term debt to reserves ratio, real GDP growth, public external debt to fiscal revenue ratio, external financial requirements (current account balance plus short-term debt to foreign reserves ratio), exchange rate overvaluation, and exchange rate volatility. According to them, a relatively "debt safe" country type is described by a handful of debt management prerequisites: low total external debt (below 49.7% of GDP); low short-term debt (below 130% of reserves); low public external debt (below 214% of fiscal revenue); and an exchange rate that is not excessively appreciated (overvaluation below 48%).

Manasse and Roubini identify three types of debt-related risks, which include solvency (or debt un-sustainability), illiquidity, and macro-exchange rate risks. The risk of unsustainable external debt is characterized by external debt in excess of 49.7% of GDP, together with monetary or fiscal imbalances, and large external financing needs that signal illiquidity. The liquidity risk is identified by moderate debt levels, in conjunction with short-term debt in excess of 130% of reserves, political uncertainty, and tight international capital markets. Macro-exchange rate risk types arise from the combination of low growth and relatively fixed exchange rates. Each of these risk types differs in their likelihood to produce a debt crisis.

In contrast to these preceding views on indicators of indebtedness, Caliari (2006) argues that these various indicators used to establish the debt thresholds are poor proxies for how an economy is faring and, particularly, how well a government is meeting its revenue needs to achieve human development goals. He contends that the HIPC initiative has been heavily criticized for relying mainly on debt-to-export and debt-service-to-export ratios as indicators for measuring sustainability of indebtedness. For instance, he finds that export revenue does not necessarily correlate with growth, poverty reduction rates or, more importantly, fiscal revenue. Furthermore, he notes that the chosen thresholds, being fixed numerical thresholds, are unable to capture the possible variation in a country's situations. Caliari recommends that human development imperatives take precedence over debt payments, with debt sustainability assessments geared towards ensuring that debtor countries are able to fulfil the financing requirements needed to meet both the human development and the millennium development goals.

From the foregoing, it is evident that the most commonly used indicators of indebtedness are the debt service ratio, debt to GDP ratio, international reserves to debt ratio, international reserves to debt service ratio, and interest payments to net export earnings. In view of the fact that most African countries are still battling with debt service problems even though they have achieved debt sustainability thresholds envisaged by the HIPC initiative, there is a need to identify thresholds that will lead to better debt management for them. Further, HIPC thresholds of indebtedness are too high given that these countries are as well grappling with both weak macroeconomic and governance infrastructures. From the information in Table A1 (in the Appendix), notice that even though under the HIPC initiative a debt to GNP level of less than 250% is deemed sustainable, the poorer African countries like Zambia and Tanzania had achieved that threshold by 1995 when these countries were still grappling with heavy debt service problems and were asked to reschedule their debts. In fact, most sample countries had debt to GNP ratios of below 100%. Furthermore, note that the Sub-Saharan African countries and Latin American countries also have persistent current account deficits that threaten their external debt sustainability (see Fig. A1).

Tellingly, by 2005, Malawi, which was both at the decision point and had received 90% debt relief, had not achieved HIPC's debt to export ratio of 150%. Additionally, by 2008, Burkina Faso, The Gambia and Liberia had not achieved HIPC's debt to export ratio of 150%. In fact, Easterly (2002) posits that debt relief does not even bring about a reduction in debt, as governments of poor countries borrow anew until they again become heavily indebted. A related argument is put forth by Ferrarini (2008) who argues that full debt cancellation falls short of providing a long-term solution in the event of a renewed build-up of unsustainable debt levels, as the HIPC initiative has amply demonstrated. This observation is highlighted by Fig. 1, in which external debts of both the Democratic Republic of Congo and Liberia are above their GDPs even after the two countries reached their HIPC completion points. Note how almost all HIPCs exhibit trends where indebtedness surpasses GDP.[5]

[5] HIPCs included in the sample are Burkina Faso, Cameroon, Côte d'Ivoire, Republic of Congo, Democratic Republic of Congo, The Gambia, Ghana, Liberia, Malawi, Mali, Mozambique, Senegal, Sierra Leone, Tanzania, Uganda and Zambia.

Going by Manasse and Roubini's (2009) thresholds, African countries are battling with both liquidity and solvency problems. It is therefore paramount that workable thresholds that can be used as benchmarks for effective debt borrowing and management are identified. Among other benefits, this paper contributes to the literature by computing workable debt sustainability thresholds for African countries.

2.1. Empirical model for external debt thresholds

To identify appropriate thresholds for external debt, regression models are estimated, wherein the indebtedness ratios are regressed against different thresholds. Three regions of the world's emerging economies are then compared: Latin America, East Asia and Africa. Africa is represented by twenty four countries that include Angola, Burkina Faso, Cameroon, Democratic

Fig. 1. The relationship between external debt and GDP trends for selected Africa countries. Non-HIPCs in the sample include Angola, Gabon, Kenya, Lesotho, Nigeria, South Africa and Zimbabwe.

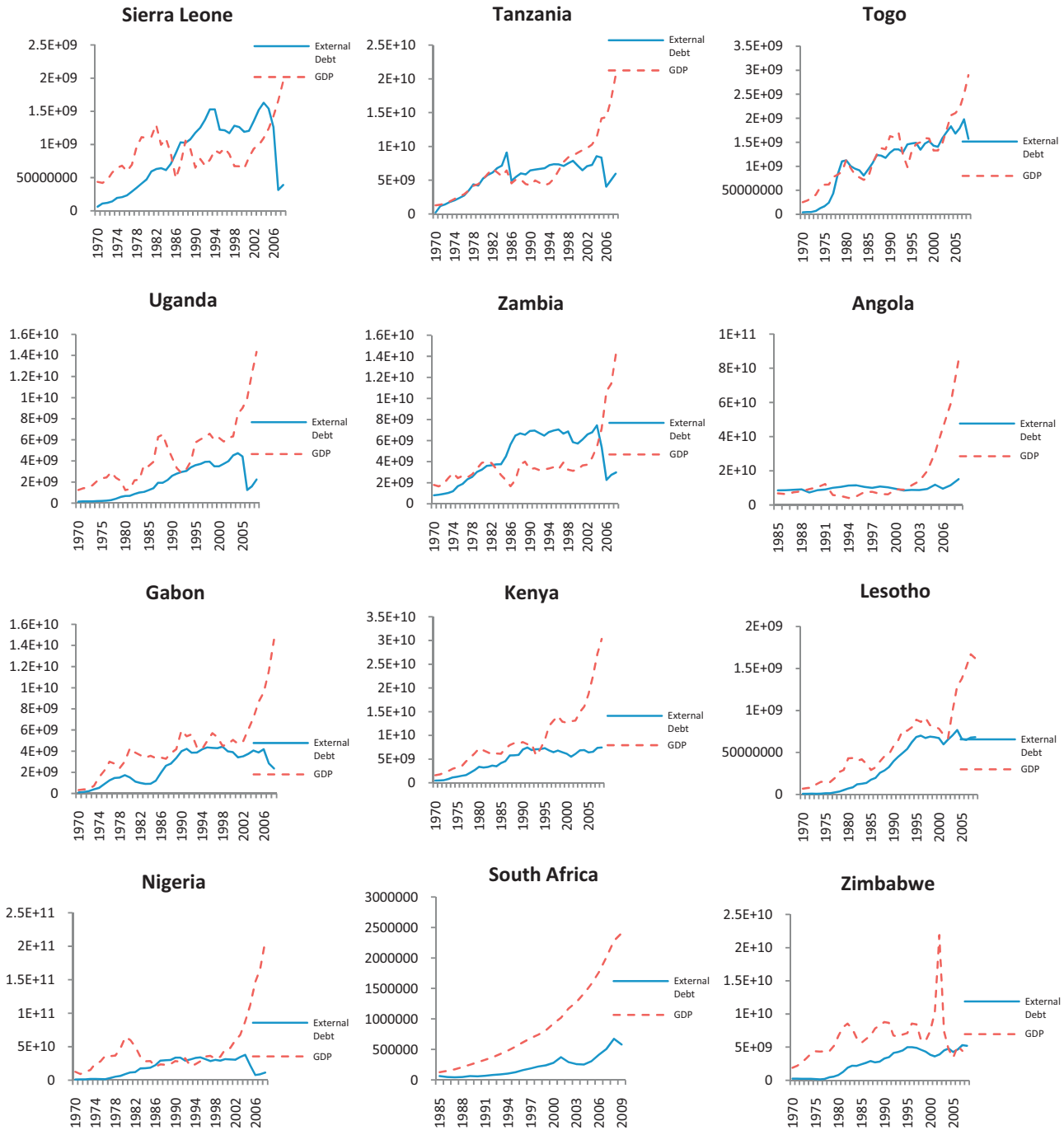

Fig. 1. (*continued*).

Republic of Congo, Republic of Congo, Côte d'Ivoire, Gabon, The Gambia, Ghana, Kenya, Lesotho, Liberia, Malawi, Mali, Mozambique, Nigeria, Senegal, Sierra Leone, South Africa, Tanzania, Togo, Uganda, Zambia and Zimbabwe. The sample consists of both HIPCs and non-HIPCs. Latin America is represented by Argentina, Brazil, Chile, Colombia, Ecuador, Jamaica, Mexico, Peru, Uruguay and Venezuela; whilst East Asia is represented by South Korea, Indonesia, Malaysia, Philippines and Thailand. The East Asian and Latin American countries are largely middle income countries that have managed to sustain their external debts.

In selecting Latin America and East Asia as benchmarks, several factors were considered. First, East Asian countries used their external borrowing to pursue export-promoting policies that are not laissez-faire (Sachs and Williamson, 1985). Latin American countries, like African countries, did not use their foreign borrowing to develop a resource base in tradable goods, especially export industries that are adequate for future debt servicing. Exports grew more rapidly in East Asia than in Latin America and Africa; in fact, export growth in East Asia greatly outstripped GDP growth. Second, Africa and Latin America overvalued their currencies and encouraged capital

flight hence leading to "flight-driven external borrowing," in which the export of capital generates an economy-wide demand for replacement funds, and "flight-fuelled external borrowing," in which residents who exported capital then "borrow" their own money back[6]". Sachs and Williamson (1985) observe that foreign borrowing by Latin American countries largely went towards the private sector's accumulation of foreign assets, rather than towards increase of export capacity. East Asia on its part devalued its currency to promote its export sector. Third, both Africa and Latin America's terms of trade deteriorated faster than East Asia's terms of trade. See Fig. A1 in the Appendix for further comparisons of debt profile between regions of emerging economies.

Data for indicators of indebtedness for the three regions cover 1970–2008. In computing the thresholds, we follow Clements et al. (2003) by running regressions of debt indicators against various thresholds. Thresholds used for this benchmarking, range from indebtedness ratio of 0 to >200%. Each threshold level is coded 1 whilst others are coded 0, repeatedly. Data sources are World Bank's Global Development Fund and World Development Indicators. The thresholds serve as independent variables. Both debt to GDP ratio and the debt to exports ratio capture solvency whilst short-term debt to international reserves ratio captures liquidity. These indebtedness indicators serve variously as dependent variables. We estimate the model using the fixed effects method.[7] The advantage of a fixed effects model is that it provides consistent estimates in the presence of country-specific effects that are correlated with the explanatory variables in the model (Table 1).

The results for the regression of different indicators of indebtedness against different thresholds for the three regions – Africa, Latin America and East Asia – show that the debt to GDP ratio falls if either a country's GDP rises faster than debt or if external debt falls whilst GDP remains unchanged. External debt to GDP levels of 60–80% are sustainable for Africa whilst in Latin America, a debt-to-GDP ratio of 120–150% is sustainable. These results imply that when African countries contract debt, they should ensure that the debt does not exceed 80% of GDP. The debt sustainability level for Latin America (120–150%), for instance, would portend insolvency for African countries. Using debt to exports ratio, the sustainable debt level for Africa is 40–60% of export earnings whereas in Latin America, a debt level that is 20–40% of export earnings is sustainable. Given that exports are used to repay the debt, African countries should not exceed a debt to exports ratio of 60%. For East Asia, the debt to exports threshold is 60–80%. The higher debt-to-exports ratio of East Asian countries relative to those of African and Latin American countries is a confirmation of the superior exports performance of the East Asian region. Overall, these regional debt thresholds are far much below HIPC initiative's recommended debt to exports ratio of 150% and Pattillo et al.'s (2002) threshold of 160–170% debt to exports.

On liquidity, short-term debt to reserve ratio should not exceed 80% for all the three regions. This ratio is below that suggested by Manasse and Roubini (2009) – 130% of short-term debt to reserves. For Africa and Asia, a liquidity threshold of 130% has an insignificant negative effect on debt accumulation whilst for Latin America the same threshold has an insignificant positive effect on debt accumulation.

2.2. Impact of external debt thresholds on the output of countries

To determine the impact of the thresholds computed above on the sample countries' wealth, Eq. (1), which reflects equilibrium in the goods market, is estimated.[8]

$$Y_t = \theta_1 C_t + \theta_2 G_t + \theta_3 X_t - \theta_4 C_t^m - \theta_5 I_t^m, \quad (1)$$

where Y_t is output; C_t is consumption; G_t is government expenditure; X_t is exports; C_t^m represents consumption imports; and I_t^m is imported investments. We measure output, consumption, government expenditure, exports and consumption imports by taking the logarithm of Gross Domestic Product, household consumption, government expenditure, exports and imports, respectively. We use gross fixed capital formation as a proxy to measure imported investments. The assumption here is that these countries import capital for investment purposes.

The ratio of price index of exports to price index of imports captures the terms of trade. Terms of trade measures the effect of volatility in commodity prices. Relative interest rate is computed by the ratio of the world interest rate to the domestic interest rate. The USA lending rate is used as the proxy for world interest rate. The ratio measures the direction of portfolio capital flow into and from the domestic economy; it is expected to relate negatively to output. The intuition here is that an increase in the relative interest rate implies that capital flows out of the domestic economy; thus, GDP falls. In fact, empirical literature provides evidence that capital outflow depresses GDP (Boyce, 1992; Ajayi, 1997; Boyce and Ndikumana, 2001; Ndikumana and Boyce, 2003). These two variables, terms of trade and relative interest rate, will be used as proxies to measure external shocks.

The relative interest rate, terms of trade, lagged inflation (which measures macroeconomic instability) and exchange rate are included as explanatory variables, in addition to household consumption, exports, consumption imports and investment imports. The ratio of debt-to-GDP and debt-to-exports also enters the baseline model interchangeably as explanatory variables. The dependent variable in this model is the growth rate of GDP.

A panel data of the 24 African countries is used for estimating this model. The panel is unbalanced and hence we use the fixed effects method to estimate the coefficients of the regression. In fact, Judson and Owen (1999) argue that the fixed effects model

[6] See Boyce (1992) for a detailed discussion of "flight-driven external borrowing" and "flight-fuelled external borrowing".

[7] The panel used in this regression is unbalanced, hence the fixed effects method gives valid and consistent estimates.

[8] This model is adopted from Muhanji and Ojah (2011), who derive a structural model of external debt evolution for small open economies of Africa.

Table 1
Threshold levels for external debt indicators.

Thresholds (Percent)	Africa			Latin America			East Asia		
	Log (ETD/GDP)	Log (EDT/XGS)	Log (SETD/RES)	Log (ETD/GDP)	Log (EDT/XGS)	Log (SETD/RES)	Log (ETD/GDP)	Log (EDT/XGS)	Log (SETD/RES)
Intercept	0.196	0.206	0.376	0.203	−0.239	0.050	0.308	−0.421	−0.425
	(4.83)***	(0.51)	(1.86)*	(5.20)***	(−5.55)***	(1.07)	(2.05)**	(−2.34)**	(−2.22)**
<20	−0.313	−2.118	−3.495	−0.991	(dropped)[a]	−1.253	−0.463	(dropped) [a]	−0.682
	(−4.58)***	(−4.88)***	(−15.03)***	(−24.24)***		(−18.72)***	(−2.98)***		(−3.22)***
>20–40	−0.195	−1.218	−1.533	−0.725	−0.335	−0.609	−0.388	−0.291	−0.431
	(−3.83***	(−2.93)***	(−6.38)***	(−18.15)***	(−4.35)***	(−10.65)***	(−2.56)**	(−1.54)	(−2.17)**
>40–60	−0.136	−0.884	−0.999	−0.521	(dropped) [a]	−0.364	−0.196	−0.255	−0.442
	(−2.68)**	(−2.14)**	(−4.09)***	(−13.17)***		(−6.61)***	(−1.30)	(−1.37)	(−2.31)**
>60–80	−0.090	−0.549	−0.566	−0.376	0.112	−0.193	−0.100	−0.319	−0.378
	(−1.80)*	(−1.33)	(−2.13)**	(−9.55)***	(2.21)**	(−3.41)***	(−0.66)	(−1.73)*	(−1.89)*
>80–100	−0.046	−0.289	−0.389	−0.269	0.236	−0.083	−0.039	−0.116	−0.294
	(−0.96)	(−0.70)	(−1.48)	(−6.48)***	(4.47)***	(−1.47)	(−0.25)	(−0.63)	(−1.43)
>100–120	−0.036	−0.216	0.271	−0.170	0.289	(dropped) [a]	(dropped) [a]	0.045	−0.275
	(−0.73)	(−0.53)	(0.77)	(−4.04)***	(5.53)***			(0.25)	(−1.34)
>120–150	0.237	0.148	0.315	−.092	0.398	0.075	0.299	0.184	−0.280
	(4.48)***	(0.36)	(0.90)	(−2.03)**	(8.84)***	(1.33)	(1.40)	(1.00)	(−1.39)
>150–200	0.638	0.453	0.372	(dropped) [a]	0.510	0.239	0.207	0.200	−0.317
	(9.85)***	(1.11)	(1.20)		(11.45)***	(3.73)***	(1.13)	(1.09)	(−1.57)
>200	0.196	1.183	1.890	(dropped) [a]	0.713	0.425	0.925	0.437	0.059
	(4.83)***	(2.90)***	(1.86)*		(16.30)***	(7.56)***	(5.62)***	(2.39)**	(0.31)
Observations	882	885	819	378	377	374	190	189	186
Overall R^2	0.8434	0.8250	0.7317	0.9226	0.7902	0.7750	0.6246	0.4924	0.4535
F (H0: all coefficients = 0)	13.52***	17.91***	7.15***	4.08***	16.02***	3.93***	53.28***	14.01***	1.40

The table contains fixed effects estimates of different threshold levels. The column headings are logarithms of external debt to GDP ratio (ETD/GDP), external debt to exports ratio (ETD/XGS) and, short term external debt to international reserves (SETD/RES). The t-stats are in parentheses.

[a] These thresholds did not have data and were therefore dropped from the regression.

* Significance levels of 10%.

** Significance levels of 5%.

*** Significance levels of 1%.

Table 2
Effect of threshold-based external debt on GDP for African countries (dependent variable: growth rate of GDP).

Variables	ETD/GDP < 80%	ETD/GDP > 80%	Variables	ETD/XGS < 60%	ETD/XGS > 60%	ETD/XGS > 150%
Intercept	5.626	9.275	Intercept	4.016	9.153	8.437
	(11.85)***	(52.09)***		(6.97)***	(45.03)***	(39.72)***
Consumption	0.024	0.148	Consumption	−0.082	0.178	0.264
	(0.45)	(3.84)***		(−1.47)	(4.69)***	(7.05)***
Exports	0.561	0.192	Exports	0.494	0.208	0.179
	(4.64)***	(3.59)***		(3.88)***	(3.26)***	(2.62)**
Consumption imports	−0.404	−0.320	Consumption imports	−0.011	−0.495	−0.590
	(−2.66)***	(−4.39)***		(−0.07)	(−5.92)***	(−7.19)***
Imported investments	0.281	0.052	Imported investments	0.211	0.188	0.304
	(3.46)***	(1.42)		(2.47)**	(4.33)***	(6.51)***
Terms of trade	−0.024	−0.045	Terms of trade	0.016	−0.046	−0.055
	(0.75)	(−6.25)***		(0.46)	(−4.96)***	(−5.26)***
Relative interest rate	−0.034	−0.186	Relative interest rate	−0.012	−0.201	−0.217
	(−0.79)	(−7.78)***		(−0.26)	(−7.32)***	(−8.50)***
Exchange rate	0.217	0.033	Exchange rate	0.304	0.034	0.149
	(10.84)***	(4.14)***		(13.52)***	(3.72)***	(6.86)***
Lagged inflation	0.001	0.0001	Lagged inflation	0.002	−0.0001	0.0007
	(4.99)***	(0.49)		(5.00)***	(−0.44)	(1.39)
Debt to GDP ratio	0.042	−0.191	Debt to exports ratio	0.091	−0.020	−0.012
	(0.75)	(−15.09)***		(8.61)***	(−7.44)***	(−4.37)***
Observations	359	281		256	384	291
F(H0: $u_i = 0$)	83.84***	209.07***		109.99***	152.53***	133.71***

The Z-stats are in parentheses. The variable ETD/GDP < 80% represents the debt-to-GDP ratio that is below 80% whilst ETD/GDP > 80% represents the debt-GDP ratio that is above 80%. Similarly, ETD/XGS < 60% represents the debt-to-exports ratio that is below 60% whilst ETD/XGS > 60% represents the debt-to-exports ratio that is above 60%. The variable ETD/XGS > 150% is the World Bank threshold for HIPC countries.
* Significance levels of 10%.
** Significance levels of 5%.
*** Significance levels of 1%.

is a common choice for macroeconomists, and it is generally more appropriate than a random effects model for two reasons. First, if the individual effect represents omitted variables, it is likely that these country-specific characteristics are correlated with the other regressors. Second, it is also likely that a typical macro panel will contain most countries of interest and, thus, will not likely be a random sample from a much larger universe of countries. For these reasons, only the fixed effects model results are reported. Wooldridge (2002) supports Judson and Owen (1999) and insists that the test statistics based on the unbalanced fixed effects analysis are consistent and asymptotically normal.

The data for estimating the model is divided into two threshold-based halves: the portion before the threshold (of 80% debt to GDP or 60% debt to exports) and the portion after the threshold. We use external debt to GDP and external debt to exports to identify how different thresholds affect the growth rate of GDP. We also test the World Bank recommended ratio of debt to exports ratio of 150% alongside our thresholds. Results of this estimation are presented in Table 2.

In estimating the model, we dropped government expenditure because of its high correlation with imported investments.[9] Results confirm that high levels of external debt negatively and significantly affect GDP whilst low levels of external debt increase GDP (see last row of Table 2). Specifically, when debt-to-GDP ratio increases by 1% above a debt-to-GDP ratio of 80%, growth rate in GDP significantly falls by 0.19%. This result suggests that a high level of external debt retards the economy. At low debt levels (i.e., <80% debt to GDP), an increase in the debt-to-GDP ratio insignificantly increases GDP by 0.04%. At this low debt level, exports, imported investments, lagged inflation and a depreciation of the exchange rate increases growth rate of GDP whilst consumption imports reduce GDP.

At high debt levels, household consumption, exports, and a depreciation of the exchange rate increases GDP whilst consumption imports, relative interest rate and the terms of trade depress GDP. Relative interest rate negatively affects GDP because foreign interest rate is higher than the domestic interest rate and consequently capital flows out of the country. Capital outflow has a detrimental effect on GDP. Terms of trade have an interesting effect, in the sense that they negatively affect GDP at high levels of debt. This can be explained by the fact that these countries mainly export primary commodities; so when the terms of trade improve, they suffer from the "Dutch disease" and hence GDP falls.

When external debt-to-exports ratio is substituted into the equation in place of external debt-to-GDP ratio, an increase in the debt-to-exports ratio increases growth rate of GDP at low levels (<60% debt to exports). Specifically, an increase in debt-to-exports ratio by 1% significantly increases growth rate of GDP by 0.09%. On the other hand, at high debt-to-exports ratio (>60% debt to exports), an increase in debt-to-exports ratio

[9] Note that these countries import capital for investment purposes and therefore imported investments form part of their government expenditure.

significantly reduces growth rate of GDP by 0.02%. Note that the effects of pertinent macroeconomic factors (which largely serve as controls in this analysis) are robust to the choice of indebtedness indicators used in our validation of the derived African-relevant thresholds for sustainable indebtedness.

The literature has identified poor governance as a main impediment to the sustainability of external debt in African countries. These countries cannot sustain the above recommended ratios if issues of adequate governance infrastructures are not addressed. In fact, Manasse et al. (2003) argue that institutional factors affect policy credibility as well as a government's ability to pursue policies consistent with a sustainable debt path. Therefore, the next section analyzes the impact of institutional infrastructure (both legal and political) on debt sustainability.

3. Governance infrastructures and external debt sustainability

Crucial institutions and governance structures play important roles in debt sustainability. Chauvin and Kraay (2005) show that debt relief, in 62 developing countries during 1989–2003, neither improved the institutional quality nor raised the levels of foreign direct investment (FDI) or economic growth. Easterly (2002) finds that highly indebted poor countries became highly indebted mainly because of poor policies, not because of external shocks or wars. He concludes that lenders did not adhere to prudential rules and that the IMF and the World Bank provided far more financing to HIPCs throughout 1979–1997 than to other emerging economies of similar income levels, although relevant policies in many HIPCs had been worse.

This study follows Kaufmann et al. (2008) in defining governance infrastructures as the traditions and institutions by which authority is exercised in a country. This includes the process by which governments are selected, monitored and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for institutions that govern economic and social interactions among them. The six dimensions of governance include voice and accountability, political stability and absence of violence, government effectiveness, and rule of law, regulatory quality and control of corruption.

Voice and accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government as well as freedom of expression, freedom of association and a free media. Political stability and absence of violence captures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means. Government effectiveness captures the perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation and the credibility of the government's commitment to such policies. Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of the society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Finally, control of corruption captures the perceptions of the extent to which public power is exercised for private gain.

Instead of using the six governance indices separately in the analysis, they are grouped into two broad constructs: political and legal. The political variable is computed as the average of voice and accountability, government effectiveness and, political stability and absence of violence whilst the legal variable is computed as the average of the rule of law and regulatory quality. The aim of this section is to identify the role that governance infrastructure plays in external debt management.

Data on governance is downloaded from the World Bank's World Governance Indicators. The scores lie between 2.5 and −2.5, with higher scores indicating better outcomes. (For details on computation of the indices see Kaufmann et al., 2008). Data for governance indices covers 1996–2009.

3.1. Empirical analysis

To gauge the effect of governance infrastructures on debt sustainability, we run regressions of debt indicators against institutional variables and macroeconomic variables. External debt to GDP (the solvency indicator) and short-term debt to international reserves (the liquidity indicator) ratios are used as the dependent variables. As part of the explanatory variables, institutional variables such as political and legal infrastructures, and macroeconomic variables such as inflation rate volatility, terms of trade, and the relative interest rate which capture both a country's ability to pay and willingness to pay are included in the model.

The vector $X_{i,t}$ represents ratios of exports earnings to GDP, consumption imports to GDP, imported investments to GDP; exchange rate, terms of trade, relative interest rate and governance (institutional) variables such as political and legal infrastructures. The variable $Z_{i,t-1}$ represents the lagged inflation rate and the lagged growth rate of GDP. The lagged inflation rate enters as a policy variable and is used to capture macroeconomic instability. The dependent variables (debt to GDP and short-term debt to reserves ratios, respectively) are represented by $Y_{i,t}$. The model is thus of the form:

$$Y_{i,t} = \beta_0 + \sum_{i=1}^{N} \beta_i X_{i,t} + \sum_{j=1}^{2} \alpha_j Z_{j,t-1} + \varepsilon_{i,t} \quad t = 1, \ldots, T. \quad (2)$$

Eq. (2) is estimated for the three regions of East Asia, Latin America and Africa. Three panel regressions are estimated for: all the 39 countries, East Asian countries, Latin American countries and African countries, respectively. Most of the variables have the expected signs. Eq. (2) is also estimated for HIPC and non-HIPC African countries and most of the variables retain their expected signs.

3.2. Results and discussion of region-based tests

Table 3 reports results of the regressions for debt sustainability indicators of solvency and liquidity, respectively, against

Table 3
Fixed effects estimation of indicators of solvency and liquidity, with a focus on governance infrastructures.

Dependent variable	Africa						Latin America					
	ETD/GDP ratio			SETD/RES ratio			ETD/GDP ratio			SETD/RES ratio		
	1	2	3	1	2	3	1	2	3	1	2	3
Intercept	18.464	18.870	19.068	18.864	18.785	18.937	7.799	7.833	7.756	9.649	9.297	9.371
	(24.03)***	(24.22)***	(23.59)***	(10.53)***	(10.24)***	(9.96)***	(9.58)***	(9.70)***	(9.48)***	(5.08)***	(5.08)***	(5.05)***
Lag inflation	0.054	0.049	0.040	−0.007	−0.002	−0.009	−0.026	−0.028	−0.025	−0.228	−0.225	−0.227
	(2.15)**	(2.02)**	(1.54)	(-0.12)	(−0.04)	(−0.15)	(−0.26)	(−0.28)	(−0.25)	(−0.98)	(−0.99)	(−0.99)
Exports	−0.699	−0.688	−0.705	−3.229	−3.220	−3.229	−1.864	−1.859	−1.928	−0.551	−1.039	−0.972
	(−2.25)**	(−2.23)**	(−2.29)**	(−4.36)***	(−4.35)***	(−4.35)***	(−4.08)***	(−4.10)***	(−4.14)***	(−0.52)	(−1.01)	(−0.92)
Consumption imports	0.638	0.641	0.639	1.350	1.355	1.350	2.432	2.457	2.530	−1.143	−0.432	−0.503
	(2.67)***	(2.71)***	(2.70)***	(2.33)**	(2.34)**	(2.33)**	(5.23)***	(5.24)***	(5.25)***	(−1.05)	(−0.41)	(−0.46)
Lag GDP growth	0.002	0.001	0.001	0.003	0.003	0.003	−0.002	−0.003	−0.002	0.002	0.003	0.002
	(0.48)	(0.22)	(0.33)	(0.30)	(0.25)	(0.29)	(−0.94)	(−1.01)	(−0.92)	(0.35)	(0.46)	(0.42)
Log investment	−0.724	−0.755	−0.759	−0.437	−0.439	−0.442	−0.437	−0.422	−0.397	−0.512	−0.229	−0.253
	(−7.71)***	(−8.01)***	(−8.04)***	(−1.97)**	(−1.95)***	(−1.95)***	(−2.61)**	(−2.47)**	(−2.27)**	(−1.31)	(−0.59)	(−0.64)
Log consumption	−1.128	−1.133	−1.154	−1.651	−1.638	−1.654	−0.319	−0.335	−0.356	−0.333	−0.593	−0.573
	(−9.63)***	(−9.90)***	(−9.89)***	(−6.00)***	(−6.03)***	(−5.97)***	(−1.66)*	(−1.72)*	(−1.80)*	(−0.74)	(−1.34)	(−1.28)
Relative interest rate	−0.357	−0.379	−0.371	0.365	0.357	0.363	0.016	0.021	0.016	−0.234	−0.240	−0.235
	(−2.73)***	(−2.92)***	(−2.85)***	(1.18)	(1.16)	(1.17)	(0.30)	(0.39)	(0.03)	(−1.88)*	(−2.00)**	(−1.93)**
Terms of trade	−0.309	−0.313	−0.312	0.533	0.532	0.532	0.323	0.320	0.333	−0.358	−0.281	−0.293
	(−4.44)***	(−4.54)***	(−4.52)***	(3.28)***	(3.28)***	(3.27)***	(4.38)***	(4.41)***	(4.44)***	(−2.08)**	(−1.71)*	(−1.72)*
Exchange rate	−0.087	−0.084	−0.082	−0.017	−0.019	−0.017	0.189	0.170	0.199	−0.210	−0.115	−0.143
	(−2.33)**	(−2.27)**	(−2.21)**	(−0.20)	(−0.22)	(−0.19)	(2.29)**	(2.35)**	(2.38)**	(−1.09)	(−0.70)	(−0.75)
Legal	0.048		−0.099	−0.061		−0.078	0.011		0.044	−0.261		−0.043
	(0.57)		(−0.93)	(−0.31)		(−0.13)	(0.23)		(0.69)	(−2.34)**		(−0.30)
Political		0.163	0.219		−0.017	0.026		−0.028	−0.067		−0.480	−0.442
		(2.12)**	(2.25)**		(−0.10)	(0.12)		(−0.44)	(−0.79)		(−3.31)***	(−2.28)**
Observations	276	276	276	271	271	271	103	103	103	103	103	103
F(H0: $u_i = 0$)	35.83***	36.81***	36.64***	13.41***	13.03***	12.74***	22.63***	26.46***	22.52***	11.49***	14.87***	11.88***

Table 3 (*Continued*)

Dependent variable	East Asia						All 39 countries					
	ETD/GDP ratio			SETD/RES ratio			ETD/GDP ratio			SETD/RES ratio		
	1	2	3	1	2	3	1	2	3	1	2	3
Intercept	11.680 (8.73)***	12.375 (9.31)***	11.540 (8.59)***	11.597 (6.90)***	11.764 (7.38)***	11.798 (7.02)***	16.028 (25.61)***	15.903 (25.25)***	16.282 (25.47)***	15.995 (12.44)***	15.783 (12.28)***	15.640 (11.89)***
Lag inflation	0.611 (1.71)*	0.660 (1.79)*	0.560 (1.55)	0.300 (0.67)	0.369 (0.83)	0.373 (0.83)	0.048 (2.05)**	0.058 (2.54)**	0.041 (1.76)*	0.027 (0.56)	0.029 (0.63)	0.036 (0.74)
Exports	−0.361 (−0.55)	−0.104 (−0.16)	−0.487 (−0.73)	−1.870 (−2.27)**	−1.704 (−2.14)**	−1.688 (−2.02)**	−0.816 (−3.25)***	−0.780 (−3.09)***	−0.802 (−3.20)***	−2.948 (−5.62)***	−2.977 (−5.68)***	−2.970 (−5.66)***
Consumption imports	0.252 (0.40)	0.001 (0.00)	0.285 (0.25)	1.198 (1.51)	1.162 (1.52)	1.150 (1.45)	0.802 (3.82)***	0.808 (3.82)***	0.813 (3.88)***	1.429 (3.19)***	1.414 (3.17)***	1.413 (3.16)***
Lag GDP growth	0.006 (0.83)	0.006 (0.84)	0.004 (0.57)	0.007 (0.75)	0.009 (1.02)	0.009 (1.01)	0.002 (0.72)	0.002 (0.63)	0.002 (0.57)	0.008 (1.26)	0.008 (1.35)	0.008 (1.36)
Log investment	−0.388 (−1.46)	−0.263 (−0.96)	−0.352 (−1.32)	−0.249 (−0.75)	−0.305 (−0.93)	−0.301 (−0.90)	−0.641 (−7.59)***	−0.661 (−7.68)***	−0.667 (−7.81)***	−0.408 (−2.32)**	−0.373 (−2.09)**	−0.371 (−2.08)**
Log consumption	−0.696 (−2.45)**	−0.853 (−2.92)***	−0.739 (−2.57)**	−0.646 (−1.81)*	−0.580 (−1.66)*	−0.585 (−1.63)	−0.910 (−9.20)***	−0.876 (−8.86)***	−0.907 (−9.20)***	−1.226 (−5.98)***	−1.243 (6.11)***	−1.232 (−6.01)***
Relative interest rate	−0.212 (−2.17)**	−0.197 (−1.95)**	−0.203 (−2.08)**	−0.143 (−1.17)	−0.156 (−1.28)	−0.155 (−1.27)	−0.055 (−0.76)	−0.070 (−0.96)	−0.059 (−0.83)	0.156 (1.05)	0.166 (1.13)	0.163 (1.10)
Terms of trade	0.405 (1.31)	0.225 (0.73)	0.403 (1.31)	0.327 (0.84)	0.337 (0.91)	0.329 (0.85)	−0.172 (−3.02)***	−0.162 (−2.84)***	−0.181 (−3.19)***	0.292 (2.50)**	0.298 (2.56)**	0.305 (2.61)**
Exchange rate	0.113 (0.58)	0.037 (0.18)	0.229 (1.02)	−0.952 (−3.87)***	−1.109 (−4.36)***	−1.117 (−4.00)***	−0.040 (−1.19)	−0.030 (−0.90)	−0.042 (−1.25)	−0.092 (−1.33)	−0.094 (−1.36)	−0.089 (−1.29)
Legal	0.263 (1.90)**		0. 377 (2.16)**	0.149 (0.86)		−0.016 (−0.07)	−0.116 (−2.11)**		−0.187 (−2.79)***	−0.029 (−0.26)		0.071 (0.52)
Political		0.031 (0.32)	−0.127 (−1.07)		−0.176 (−1.51)	0.183 (1.22)		0.015 (0.26)	0.131 (1.84)*		−0.140 (−1.18)	−0.184 (−1.26)
Observations	68	68	68	68	68	68	447	447	447	442	442	442
F(H0: $u_i = 0$)	11.99***	10.28***	11.07***	10.53***	11.31***	11.07***	30.42***	30.21***	30.69***	13.18***	13.23***	13.16***

The column heading ETD/GDP represents the ratio of debt stock to GDP (the solvency proxy); SETD/RES is the logarithm of short-term external debt to reserves ratio (the liquidity proxy). The Z-stats are in parentheses.

* Significance levels of 10%.

** Significance levels of 5%.

*** Significance levels of 1%.

policy and governance variables. There is a strong correlation between the legal and political variables (correlation results are not reported here); thus, the two variables are first entered separately in different models. Column (1) reports results of the model which includes the legal variable; column (2) reports results of the model which includes the political variable; and column (3) reports results of the model containing all variables. We estimate the model using both the fixed effects and the 2SLS instrumental variables regression.[10] Even though both methods yield similar results in terms of coefficients and signs, we report the result for the fixed effects method. The results for the 2SLS instrumental variables regression can be provided upon request.

Given that most of the signs and significance of variables do not change after separating the legal and political variable, results of column (3) are discussed. Most of the estimated parameters for Africa, Latin America and all countries combined had the expected signs. For Africa, a rise in export earnings, imported investments and household consumptions significantly improve both solvency and liquidity whilst consumption imports worsen solvency and liquidity. Using the solvency indicator, a 1% increase in exports reduces debt to GDP ratio by about 0.71%. Likewise, a 1% increase in imported investments and household consumptions lead to a fall in debt to GDP ratio by about 0.76% and 1.15%, respectively. Surprisingly, an improvement in the political environment increases debt to GDP ratio by 0.22%. Using the liquidity indicator, a 1% increase in exports leads to about 3.23% decrease in short-term debt to international reserves ratio whilst imported investments and household consumptions reduces short-term debt to reserve ratio by 0.44% and 1.65%, respectively.

Conversely, consumption imports worsen both the solvency and the liquidity levels. Specifically, a 1% increase in consumption imports increases debt as a percentage of GDP by about 0.64%. The relative interest rate and the exchange rate significantly improve solvency and insignificantly affect liquidity. On the other hand, terms of trade significantly improve solvency but significantly worsen liquidity. Macroeconomic instability (computed as inflation rate volatility) worsens solvency but insignificantly improves liquidity.

As in Africa, a rise in export earnings, imported investments and household consumptions significantly improve solvency whilst consumption imports worsen it in Latin America. The relative interest rate and an improvement in the political environment improve liquidity. Unlike in Africa where terms of trade improve solvency and worsen liquidity, in Latin America, terms of trade significantly improve liquidity and significantly worsen solvency. In East Asia, household consumptions and the relative interest rate significantly reduce the debt-to-GDP ratio whilst exports and the exchange rate significantly improve liquidity.

When all countries are pooled together, inflation and consumption imports worsen solvency. On the other hand, exports, imported investments, household consumptions, terms of trade, and improvement in the legal environment significantly improve solvency. For liquidity, consumption imports and terms of trade significantly worsen its proxy (short term debt to reserves ratio) whilst exports, imported investments and household consumptions significantly improve it.

3.3. Results and discussion of HIPC vis-à-vis non-HIPC based tests

The results for the regression of debt sustainability against governance infrastructure indicators for HIPCs and non-HIPCs are reported in Table 4. Just as in the analysis in the preceding section, the legal and political variables are first entered separately in different models. Column (1) reports results of the model which includes the legal variable; column (2) reports results of the model which includes the political variable; and column (3) reports results of the model containing all variables. Again, we estimate the model using both the fixed effects and the 2SLS instrumental variables regression but only the result of the fixed effects method is presented.

Results of column (3) are discussed. For HIPCs, lagged inflation, consumption imports and an improvement in the political environment positively and significantly increase the debt-to-GDP ratio (increase in insolvency). On the other hand, exports, imported investments, household consumption, relative interest rate, terms of trade, and depreciation of the exchange rate negatively and significantly reduce debt-to-GDP ratio. For non-HIPCs, it is only consumption imports that significantly increase debt-to-GDP ratio (i.e., worsen insolvency) whilst imported investments and household consumptions reduce debt-to-GDP ratio.

Regarding short-term debt to reserves ratio (liquidity indicator), for HIPCs, only terms of trade increase the short-term debt to GDP levels. Only household consumptions significantly reduce illiquidity. For non-HIPCs, only consumption imports worsen illiquidity whilst exports and household consumptions significantly improve it.

3.4. Further assessment of governance infrastructure on debt management

To analyze the relative impact of exports and imports *vis-à-vis* the institutional and policy variables on indebtedness indicators of solvency and liquidity, Asiedu (2006) provides a useful analytical guide. Imports and exports are selected as pivotal variables for this further exploration because they both play a significant role in determining both solvency and liquidity for African countries. Note that exports improve solvency and liquidity whilst imports worsen them (recall results in Tables 2 and 3). Latin America and East Asia, where countries have evidently managed their external debt more sustainably than African countries (recall Fig. A1), are used as regional benchmark. Column (3) reports the estimated coefficients for all countries combined (see Table 3). Columns (4) and (5) show the equivalent effects of a change in policy and institutional environment on exports and imports, respectively.

[10] Note that the panel is unbalanced with an average of 12 observations per panel and 24 panels for Africa. This means that the random effects method yields inconsistent estimates since the error term is correlated with other regressors in the model.

Table 4
Solvency and liquidity indicators for HIPC and non-HIPC African countries.

Dependent variable	ETD/GDP ratio						SETD/RES ratio					
	HIPC			NON-HIPC			HIPC			NON-HIPC		
Independent variables	1	2	3	1	2	3	1	2	3	1	2	3
Intercept	22.571	23.185	23.111	8.088	8.011	8.366	19.259	19.227	19.130	14.883	14.849	15.156
	(26.91)***	(27.19)***	(26.65)***	(7.64)***	(7.78)***	(7.64)***	(8.32)***	(8.07)***	(7.88)***	(4.36)***	(4.44)***	(4.28)***
Inflation	0.090	0.071	0.074	0.099	0.099	0.083	0.090	0.089	0.094	0.030	0.028	0.014
	(2.86)***	(2.27)**	(2.31)**	(1.77)*	(1.77)*	(1.44)	(1.03)	(1.02)	(1.04)	(0.17)	(0.16)	(0.07)
Exports	−1.864	−1.864	−1.834	−0.461	−0.521	−0.505	−1.755	−1.798	−1.760	−3.485	−3.541	−3.516
	(−4.43)***	(−4.53)***	(−4.40)***	(−1.19)	(−1.34)	(−1.30)	(−1.50)	(−1.55)	(−1.50)	(−2.71)***	(−2.75)***	(−2.70)***
Consumption imports	0.993	1.010	1.003	1.495	1.470	1.412	0.304	0.307	0.299	2.483	2.445	2.384
	(3.39)***	(3.49)***	(3.46)***	(4.45)***	(4.32)***	(4.08)***	(0.36)	(0.36)	(0.35)	(2.28)**	(2.20)**	(2.09)**
GDP growth	0.001	0.001	0.001	0.002	0.0002	0.001	0.009	0.009	0.009	−0.015	−0.017	−0.016
	(0.29)	(0.17)	(0.14)	(0.26)	(0.04)	(0.13)	(0.61)	(0.64)	(0.62)	(−0.82)	(−0.88)	(−0.85)
Log investment	−0.592	−0.657	−0.651	−0.290	−0.264	−0.265	−0.411	−0.404	−0.396	−0.523	−0.496	−0.496
	(−5.52)***	(−6.05)***	(−5.94)***	(−2.12)**	(−1.90)***	(−1.91)***	(−1.36)	(−1.30)	(−1.26)	(−1.21)	(−1.13)	(−1.12)
Log consumption	−1.606	−1.612	−1.606	−0.610	−0.624	−0.664	−1.691	−1.700	−1.692	−1.202	−1.222	−1.258
	(−11.55)***	(−11.78)***	(−11.67)***	(−4.70)***	(−4.64)***	(−4.72)***	(−4.36)***	(−4.40)***	(−4.35)***	(−2.90)***	(−2.85)***	(−2.80)***
Relative interest rate	−0.584	−0.618	−0.620	−0.072	−0.073	−0.061	0.535	0.547	0.544	−0.083	−0.085	−0.075
	(−4.08)***	(−4.35)***	(−4.35)***	(−0.47)	(−0.48)	(−0.40)	(1.35)	(1.37)	(1.36)	(−0.16)	(−0.17)	(−0.15)
Terms of trade	−0.241	−0.246	−0.249	0.001	0.027	0.019	0.326	0.331	0.328	0.631	0.654	0.644
	(−3.81)***	(−3.95)***	(−3.97)***	(0.01)	(0.19)	(0.13)	(1.86)*	(1.90)*	(1.86)*	(1.30)	(1.35)	(1.31)
Exchange rate	−0.104	−0.082	−0.090	−0.137	−0.116	−0.113	0.084	0.090	0.081	−0.249	−0.228	−0.225
	(−1.96)**	(−1.64)*	(−1.70)*	(−1.80)*	(−1.46)	(−1.42)	(0.58)	(0.64)	(0.55)	(−1.04)	(−0.91)	(−0.89)
Legal	0.223		−0.061	−0.043		−0.119	0.041		0.080	−0.030		−0.111
	(2.18)**		(−0.48)	(−0.44)		(−0.96)	(0.15)		(0.23)	(0.10)		(−0.28)
Political		0.246	0.217		0.151	0.151		−0.014	−0.052		0.076	0.160
		(3.04)***	(2.14)**		(1.00)	(1.00)		(−0.06)	(−0.18)		(0.20)	(0.33)
Observations	199	199	199	78	78	78	197	197	197	75	75	75
F(H0: $u_i = 0$)	53.56***	57.75***	54.66***	12.44***	12.70***	12.36***	11.65***	11.78***	11.40***	8.25***	8.43***	8.14***

ETD/GDP represents the ratio of debt stock to GDP (the solvency proxy); SETD/RES is short-term external debt to reserves ratio (the liquidity proxy). The Z-stats are in parentheses.

* Significance levels of 10%.

** Significance levels of 5%.

*** Significance levels of 1%.

Table 5
Estimated equivalent effect of a change in institutional and policy variables *vis-à-vis* exports and consumption imports for Africa and Latin America.

	Africa	Latin America	Estimated coefficient[a]	Equivalent effect on	
				Exports[b], %	Consumption imports[c], %
ETD/GDP					
Political	−0.674	−0.068	0.131	9.90	−9.76
Legal	−0.724	−0.104	0.187	14.46	−14.26
GDP growth	3.397	3.206	0.002	−0.05	0.05
Relative interest rate	0.499	0.377	0.059	−0.90	0.89
Exchange rate	1.089	−0.105	0.042	−6.25	6.17
Log investments	8.995	9.699	0.667	58.55	−57.76
SETD/RES					
Political	−0.674	−0.068	0.289	5.90	−12.39
Legal	−0.724	−0.104	0.190	3.97	−8.33
GDP growth	3.397	3.206	0.037	−0.24	0.50
Relative interest rate	0.499	0.377	0.070	−0.29	0.60
Exchange rate	1.089	−0.105	0.122	−4.90	1.03
Log investments	8.995	9.699	0.371	8.79	−18.48

[a] These are the absolute values of the estimated coefficients for political and legal variables from columns 5 and 6 of Table 3.
[b] The equivalent effect of a change in the political environment from the level of Africa to that of Latin America is given by $(-0.674 + 0.068) \times 0.131/-0.802$, where −0.802 is the estimated coefficient for exports for all the 39 countries.
[c] The equivalent effect of a change in the legal environment from the level of Africa to that of Latin America is given by $(-0.724 + 0.104) \times 0.187/0.813$, where 0.813 is the estimated coefficient for consumption imports for all the 39 countries.

Focusing on the indebtedness indicator of solvency (ETD/GDP), results show that an improvement in the political environment of Africa to the level of Latin America has the same effect as increasing exports by about 9.9% and reducing consumption imports by about 9.8% (as reported in row 1 of Table 5). Likewise, an improvement in the legal infrastructure from that of Africa to that of Latin America is similar to increasing exports by about 14.5% and reducing consumption imports by about 14.3%. An increase in growth rate of GDP from Africa's level to that of Latin America has the same effect as reducing exports and increasing consumption imports by about 0.05%, which makes sense given that Africa's growth rate for this period had been greater than Latin America's growth rate. An increase in imported investments from Africa's level to that of Latin America is similar to increasing exports by 58.6% and reducing consumption imports by 57.8%. The simultaneous increase in exports and fall in consumption imports, in turn, is expected to translate into a fall in debt-to-GDP ratio, and hence improves GDP.

A noteworthy result in Table 5 is that of the exchange rate. Latin American countries overvalued their exchange rates and therefore an appreciation of the exchange rate from the level of Africa to that of Latin America is comparable to reducing exports by about 6.3% and increasing consumption imports by about 6.2%. Overvaluation of the exchange rate causes an external imbalance that leads to debt accumulation. It discourages promotion of the export sector, which in turn impedes external debt servicing.

Using the indebtedness measure of liquidity (SETD/RES), results show that an improvement of the political environment from that of Africa to that of Latin America is comparable to an increase in exports by about 5.9% and a decrease in imports of about 12.4%. Similarly, an improvement in the reliability of the legal environment from Africa's level to Latin America's level has the same effect as an increase in exports by about 4% and a decrease in imports by about 8.3%. An increase in imported investments from Africa's level to that of Latin America is similar to an increase in exports of about 8.8% and a decrease in consumption imports by about 18.5%. An appreciation of the exchange rate is similar to reducing exports by about 4.9% and increasing consumption imports by about 1.0%. In terms of liquidity, an overvalued exchange rate has a far more detrimental effect on the export sector than on the import sector.

Table 6 shows the equivalent effects of changes in policy and institutional variables on exports and imports for Africa relative to East Asia. As in Table 5, columns (1) and (2) report the average values of the institutional and policy variables for Africa and Asia. Column (3) reports the estimated coefficients for all countries combined (again, see Table 3). Columns (4) and (5) show the equivalent effects of changes in policy and institutional environments on exports and imports, respectively.

Results show that a change in political institutions from Africa's standards to East Asia's standards is similar to increasing exports by about 9.2% and reducing imports by about 9.0%. An improvement in the legal institutions from that of Africa to that of East Asia is similar to increasing exports by about 18.3% and reducing consumption imports by about 18.1%. Some of the major reasons as to why Asian countries managed their debt better is their export promotion and exchange rate management policies. If African countries adjust their exchange rate to the level of Asia, exports would increase by about 5.1% and consumption imports would reduce by about 5%. An increase in imported investments from that of Africa to East Asia is the same as increasing exports by 104.4% and reducing consumption imports by 103.0%. This is by far the most telling variable, and it reflects the empirical regularity of East Asia's notoriety in

Table 6
Estimated equivalent effect of a change in policy and institutional variables *vis-à-vis* exports and consumption imports for Africa and East Asia.

	Africa	East Asia	Estimated coefficient[a]	Equivalent effect on	
				Exports[b], %	Consumption imports[c], %
ETD/GDP					
Political	−0.674	−0.111	0.131	9.20	−9.07
Legal	−0.724	0.061	0.187	18.30	−18.06
GDP growth	3.397	5.894	0.002	0.62	−0.61
Relative interest rate	0.499	0.696	0.059	1.45	−1.43
Exchange rate	1.089	2.056	0.042	5.06	−5.00
Log investments	8.995	10.251	0.667	104.46	−103.04
SETD/RES					
Political	−0.674	−0.111	0.184	3.49	−7.33
Legal	−0.724	0.061	0.071	1.88	−3.94
GDP growth	3.397	5.894	0.008	0.67	−1.41
Relative interest rate	0.499	0.696	0.163	1.08	−2.27
Exchange rate	1.089	2.056	0.089	2.90	−6.09
Log investments	8.995	10.251	0.371	15.70	−32.98

[a] These are the absolute values of the estimated coefficients for institutional and policy variables from regressions of all countries combined that are reported in Table 3.
[b] The equivalent effect of a change in political environment from the level of Africa to that of East Asia is given by $(-0.674 + 0.111) \times 0.131/-0.802$, where −0.802 is the estimated coefficient for exports for all the 39 countries.
[c] The equivalent effect of a change in political environment from the level of Africa to that of East Asia is given by $(-0.724 - 0.061) \times 0.187/0.813$, where 0.813 is the estimated coefficient for consumption imports for all the 39 countries.

process technology building which, in turn, fosters their exemplary economic growth and its attendant capacity for better debt management.

Using the liquidity model, a stable political environment (similar to that of Asia) is the same as increasing Africa's exports by about 3.5% and reducing its imports by about 7.3%. An improvement in the reliability of the legal institutions from the level of Africa to that of East Asia is equivalent to increasing exports by about 1.9% and reducing consumption imports by about 3.9%. Additionally, adjusting the exchange rate level from that of Africa to that of East Asia is the same as increasing Africa's exports by 2.9% and reducing its consumption imports by about 6.1%. Adjusting Africa's currency value to East Asia's level would have a more positive effect in terms of promoting

Table 7
Estimated equivalent effect of a change in policy and institutional variables *vis-à-vis* exports and consumption imports for Africa's HIPC and non-HIPC countries.

	HIPC	Non-HIPC	Estimated coefficient[a]	Equivalent effect on	
				Exports[b], %	Consumption imports[c], %
ETD/GDP					
Political	−0.689	−0.638	0.219	1.58	−1.75
Legal	−0.709	−0.760	0.099	−0.72	0.79
GDP growth	3.054	3.837	0.001	0.11	−0.12
Relative interest rate	0.480	0.547	0.371	3.53	−3.89
Exchange rate	1.450	0.216	0.081	−14.18	15.64
Log investments	8.690	9.243	0.759	59.53	−65.68
SETD/RES					
Political	−0.689	−0.638	0.026	0.04	−0.10
Legal	−0.709	−0.760	0.078	−0.12	0.62
GDP growth	3.054	3.837	0.003	0.07	−0.17
Relative interest rate	0.480	0.547	0.363	0.75	−0.02
Exchange rate	1.450	0.216	0.017	−0.65	1.55
Log investments	8.690	9.243	0.442	7.57	−18.11

[a] These are the absolute values of the estimated coefficients for institutional and policy variables from regressions of all 24 African countries combined that are reported in Table 3.
[b] The equivalent effect of a change in political environment from the level of HIPC to that of Non-HIPC is given by $(-0.689 + 0.638) \times 0.219/-0.705$, where −0.705 is the estimated coefficient for exports for all the 24 African countries.
[c] The equivalent effect of a change in political environment from the level of HIPC to that of Non-HIPC is given by $(-0.709 + 0.760) \times 0.099/0.639$, where 0.639 is the estimated coefficient for consumption imports for all the 24 African countries.

exports. Increasing imported investments from the level of Africa to that of East Asia is similar to increasing exports by 15.7% and reducing imports by 33.0%.

Table 7 shows the equivalent effects of changes in policy and institutional variables on exports and imports for Africa's HIPCs relative to its non-HIPCs. As in Table 5, columns (1) and (2) report the average values of the institutional and policy variables for Africa. Column (3) reports the estimated coefficients for all African countries combined (again, see Table 4). Columns (4) and (5) show the equivalent effects of changes in policy and institutional variables on exports and imports, respectively.

Results show that a change in the political environment from that of HIPCs to that of non-HIPCs increases exports by about 1.58% and reduces imports by about 1.75%. Depreciation of exchange rate was part of the requirements for HIPCs to qualify for external debt relief. Most non-HIPC countries maintain strong currencies and hence, an appreciation of the exchange rate from the level of HIPCs to that of non-HIPCs reduces exports by about 14.2% and increases consumption imports by about 15.6%. On imported investments, if HIPCs increase their investments to the level of non-HIPCs, their exports would increase by about 59.5% whilst their consumption imports would decrease by about 65.7%. This effect is by far greater than effects of other factors.

Apart from the exchange rate and the legal environment variables (both of which are mandated by the "conditionality" of HIPC), non-HIPCs are exemplary to HIPCs in all other debt management determinants. This set of results from the HIPCs versus non-HIPCs divide suggests that more indebted countries should be keener adherers of the kind of prudent debt management guides highlighted in this study. (Note that the summary statistics of variables used for these equivalent effects analysis are reported in Table A2 in the Appendix.)

4. Conclusions

This paper derives sustainable external debt thresholds that are argued to be appropriate for African economies. It identifies external shocks that are characteristically linked to external debt accumulation and ramifications of debt accumulation. It importantly provides concrete measures of debt management gains that are possible were African countries to adopt best practices in debt relevant macroeconomic management and governance infrastructure provision from other regions of the world's emerging economies. The empirical results of the paper provide encouraging guides on possible effective ways of aiding African countries to operate at sustainable levels of external debt.

Derived sustainable external debt thresholds are substantially below levels that have hitherto been recommended by world development agencies such as IMF and the World Bank (particularly via the HIPC): that is, computed and recommended debt-to-GDP ratio of 80%, debt-to-exports ratio of 60% and short-term debt to reserves ratio of 80%, respectively, are less than corresponding HIPC-recommended ratios of 250%, 150% and 130%. Levels of external indebtedness above these thresholds computed in this paper tend to yield negative economic growth for African countries.

Improving African countries' governance infrastructures (political and legal) and macro-management practices to the standards of East Asian emerging market economies would see African countries reduce their external debt levels considerably. Similar gains would accrue were African countries to adopt governance infrastructures of South American emerging market economies, but not their macroeconomic management style. In other words, African countries in the context of prudential fiscal stewardship should not exceed a debt-to-GDP ratio of 80% and short-term debt to international reserves ratio of 80%. These results imply that beyond this level, African countries must reduce foreign borrowing since such level of debt exceeds countries' wealth and capacity to service their debt without hamstringing other aspects of their wellbeing.

Growing exports and a stable political environment promote both solvency and liquidity for African countries. Conversely, imports (particularly consumption types) worsen liquidity and solvency. Since African countries must import capital (intermediate) goods for investment purposes, they should reduce import of consumption goods and rather boost imports of investment goods. Investment goods are necessary if countries export finished goods or export goods with value-added, instead of exporting just primary goods.

Furthermore, for African countries to appropriately manage their debts, they would be wise to adopt some of the reasoned and better policies pursued by East Asian countries, especially the export promotion policies. But these policies can only be effective if countries adopt better governance institutions and exchange rate management strategies. What comes out clearly from the analyses of this study, as reported in Tables 5 and 6, is that a stable political and legal environment plays a key role in determining the level of exports and consumption imports in Africa. In fact, a stable political environment and effective legal institutions play a key role in boosting exports whilst reducing imports, both of which in turn reduce external debt.

In closing, some caveats are appropriate. The model used to derive sustainable external debt thresholds in this study is essentially static. Therefore, policy makers must be cognizant of the dynamic nature of their economies and thus, commit to computing these thresholds periodically as their economies, hopefully, progress. Furthermore, note that though the upper caps of the estimated thresholds have been highlighted, the results are in ranges. This range estimate of relevant thresholds implies that countries in regional groupings are not necessarily homogenous; therefore, each country needs to place itself appropriately within range estimates for their region.

Appendix A.

Tables A1 and A2, Fig. A1.

Table A1
Debt indicators for selected African countries (1980–2008).

Country	Debt indicator	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Angola	ETD/GDP						125	135	119	114	78.5	83.7	73.8	174	200
	ETD/XGS						349	349	366	346	232	215	244	253	372
	ETD/GNI										93.7	105	91.3	287	327
Burkina Faso	ETD/GDP	17.1	18.5	20.1	24.9	28.1	33	31.4	34.9	32.3	27.4	26.8	30.8	46.3	47.8
	ETD/XGS	191	199	245	315	256	333	349	307	294	313	245	294	523	534
	ETD/GNI	17.2	18.6	20.2	25	28.2	33.1	31.5	35	32.5	27.5	26.9	30.9	46.4	48.1
Cameroon	ETD/GDP	38.2	34.6	38.2	39.2	37.1	38.7	38.9	37.2	38.5	48.1	58.8	54.4	65.9	56.7
	ETD/XGS	137	158	115	129	111	116	167	223	240	232	291	272	321	350
	ETD/GNI	45.8	38.5	40.8	41.7	38.5	40.1	39.5	37.8	38.7	49.1	61.5	58.1	69.9	60
Congo, Republic	ETD/GDP	88.4	71.7	88.5	94.6	92.2	139	189	186	183	177	176	175	160	260
	ETD/XGS	147	124	160	163	150	244	474	445	450	365	327	389	374	587
	ETD/GNI	97.6	76	93.8	102	97.2	147	185	182	211	208	211	209	184	302
Côte d'Ivoire	ETD/GDP	73.3	96.5	118	130	125	138	125	135	130	152	160	173	166	173
	ETD/XGS	210	274	325	351	276	296	317	403	427	474	504	577	521	586
	ETD/GNI	77.1	103	128	144	135	153	135	148	143	177	187	199	189	197
Gabon	ETD/GDP	35.4	29.4	27.7	27	25.8	36.1	57.1	79.8	74.2	80	66.9	78.2	68.8	88.2
	ETD/XGS	54.7	46.4	44.9	44	43.7	57.7	162	187	202	175	145	165	149	181
	ETD/GNI	39.3	32.1	30.3	29.5	27.5	39	61.6	86.2	80	84.8	74.6	87.1	79.1	103
The Gambia	ETD/GDP	56.7	80.5	95.9	99.2	130	109	146	148	122	119	116	121	116	116
	ETD/XGS	133	183	216	197	254	248	313	300	242	216	194	190	184	200
	ETD/GNI	57.7	81.8	98.8	106	129	112	172	144	120	126	127	126	118	118
Ghana	ETD/GDP	31.5	36.4	36.8	41.1	44.4	49.8	48	64.7	58.8	62.8	63.4	63	66.1	76.7
	ETD/XGS	372	766	1102	739	552	467	289	329	324	375	376	371	384	379
	ETD/GNI	31.7	36.6	36.9	41.4	44.9	50.7	49	66.5	60.4	64.2	64.7	64.2	67.2	78.2
Kenya	ETD/GDP	46.6	47.1	52.4	60.7	56.7	68.1	63.6	72.6	69.5	71.2	82.1	91.4	83.9	124
	ETD/XGS	158	155	196	234	212	269	246	341	311	309	320	338	320	318
	ETD/GNI	48.1	48.6	54.5	62.7	58.6	70.6	65.8	75.2	72.3	73.4	85.8	95.8	87.7	132
Lesotho	ETD/GDP	16.7	19.5	30.4	30.8	37.8	60.5	61.1	65.7	63.1	68.1	68.6	69.5	65.1	71.5
	ETD/XGS	79.4	101	192	218	262	430	434	538	319	336	404	393	339	318
	ETD/GNI	10.4	11.7	16.4	16.1	19.8	33.7	34.2	35.4	36.1	40.9	42.2	43.9	43.4	49.7
Liberia	ETD/GDP	71.9	87	94.2	111	116	134	167	190	177	238	535	626	968	1385
	ETD/XGS	112	138	167	207	229	268	334							
	ETD/GNI	71.9	87	94.2	111	116	134	167	190	177	238	535	626	968	1385

Table A1 (*Continued*)

Country	Debt indicator	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Angola	ETD/GDP	278	228	140	130	167	167	103	94.4	76.4	62.3	47.3	38.6	21	19.4	17.8
	ETD/XGS	326	201	170	190	294	194	115	123	104	89.5	67.9	48.7	28.4	25.8	23.6
	ETD/GNI	581	312	179	155	206	218	126	114	89.3	71.1	54.1	44.4	23.9	22.8	21.5
Burkina Faso	ETD/GDP	59.7	53.4	50.2	53.2	52	52.5	54.5	53.1	46.9	40.5	38.9	36.7	19.5	21.5	21.2
	ETD/XGS	420	378	475	492	406	552	600	574	531	461	363	368	169	301	321
	ETD/GNI	60.1	53.6	50.1	53.2	52.1	52.6	54.6	53.2	46.9	40.5	39	36.9	19.5	21.5	21.2
Cameroon	ETD/GDP	100	125	113	108	115	101	102	99.1	90.5	79.9	65.2	43.8	18	14.2	11.9
	ETD/XGS	475	531	485	505	538	468	440	452	454	395	336	214	78.2	64.6	40.4
	ETD/GNI	107	133	121	115	121	105	109	104	96.5	83.2	67	45.1	18.3	14.9	12.2
Congo, Republic	ETD/GDP	300	278	202	213	257	209	149	157	167	154	135	95.5	90.6	78	51.1
	ETD/XGS	512	430	293	282	336	289	185	203	205	191	168	113	108	93.5	65
	ETD/GNI	350	479	352	298	338	299	210	225	230	210	208	152	129	112	77.3
Côte d'Ivoire	ETD/GDP	209	172	161	133	116	105	117	110	103	88.6	85.3	72.8	73.5	70	53.6
	ETD/XGS	516	411	391	321	295	260	288	263	205	193	176	143	140	146	115
	ETD/GNI	231	189	174	142	124	112	125	117	109	93.5	89.4	76.2	76.9	73.3	56
Gabon	ETD/GDP	99.5	87.9	75.7	80.4	98.8	85.5	77	72.6	71.2	61.9	56.6	44.7	43.9	24.6	16.3
	ETD/XGS	161	148	121	131	208	143	112	123	133	112	90.9	69.1	70.8	39.5	24.5
	ETD/GNI	113	102	87.4	92.8	112	97.3	91	83.7	78.8	70.2	67.8	50.3	53	28.3	17.6
The Gambia	ETD/GDP	117	112	115	104	110	108	115	117	156	173	168	145	143	112	55.8
	ETD/XGS	267	228	244	230	216	234	239	325	367	402	365	363	359	339	186
	ETD/GNI	118	113	117	106	116	113	121	124	166	189	184	160	158	122	57.8
Ghana	ETD/GDP	93.8	85.1	83.6	83	84.4	83.3	123	119	113	99.3	79.5	62.8	25.1	29.9	29.8
	ETD/XGS	371	347	260	256	249	260	252	264	265	244	202	172	62.4	74.7	70.3
	ETD/GNI	95.7	86.9	85.3	84.6	86.2	85.1	127	122	115	101	81.3	63.6	25.3	30.2	30.1
Kenya	ETD/GDP	99.7	80.8	56.6	49.3	48.4	50.2	48.4	42.4	46.5	46	42.9	34.3	29.1	27.2	24.5
	ETD/XGS	269	248	224	217	240	241	224	185	187	191	161	120	110	104	89.7
	ETD/GNI	105	83.8	57.6	49.9	48.9	50.9	48.9	42.9	47	46.5	43.3	34.3	29.1	27.1	24.4
Lesotho	ETD/GDP	77.8	76.9	81.2	73.7	83.4	84.4	85.8	84.1	97.7	70.7	59.4	48.1	42.8	40.6	42.1
	ETD/XGS	337	355	287	271	293	294	263	187	168	135	106	94.2	85.7	77	88.9
	ETD/GNI	55.1	55.8	59.2	54.4	63.2	64.8	66.5	67.2	78.5	56.3	47.9	39.4	34.2	32.5	33.7
Liberia	ETD/GDP	1776	1838	1528	817	715	582	503	556	586	881	835	741	677	502	414
	ETD/XGS				9299	6631	3999	2343	2400	2950	2722	2239	1955	2364	1774	1330
	ETD/GNI	1776	1838	1528	817	715	582	503	556	586	881	835	741	677	502	414

Table A1 (*Continued*)

Country	Debt indicator	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Malawi	ETD/GDP	67.1	66.4	73.3	72.9	72.8	90.2	97.8	116	98.4	88.6	82.8	75.5	94.9	88.1
	ETD/XGS	270	259	326	352	257	373	427	454	422	472	348	324	409	546
	ETD/GNI	72.9	71.1	77.9	77.4	76.4	94.6	103	121	102	91.5	84.7	77.1	97	90
Mali	ETD/GDP	40.7	55.6	65.9	76.4	94.4	111	104	106	104	106	102	107	102	108
	ETD/XGS	277	414	460	473	530	661	678	641	634	636	594	588	660	684
	ETD/GNI	41.1	56.9	67.3	78.2	95.9	113	105	107	105		103	107	102	108
Mozambique	ETD/GDP					42.6	64.4	66.6	175	199	189	189	175	261	257
	ETD/XGS					1029	2252	2638	2639	2464	2293	2309	1724	1996	1987
	ETD/GNI					43.3	65.9	68.9	189	211	205	200	186	286	280
Nigeria	ETD/GDP	13.9	19.1	24.1	50.2	63.1	65.6	110	124	130	126	117	123	88.7	144
	ETD/XGS	47.3	84.6	147	369	425	408	643	433	561	386	270	330	210	305
	ETD/GNI	14.6	19.6	24.6	51.2	64.9	68.1	118	138	133	138	131	135	97.5	162
Senegal	ETD/GDP	42.1	52.6	59.8	74.7	81.2	86.4	77.1	80.1	78.1	66.7	65.7	63.9	61.4	67
	ETD/XGS	176	166	205	212	239	310	314	377	350	273	258	277	275	331
	ETD/GNI	43.3	54.5	62.1	77.6	85.2	90.3	80.3	83.4	81.7	69.6	68	66.2	62.7	69.3
Sierra Leone	ETD/GDP	42.7	53.1	48.5	64.5	56.4	82.6	177	147	97.1	116	181	160	201	199
	ETD/XGS	187	231	308	582	531	557	1487	460	338	483	807	705	897	925
	ETD/GNI	43.9	54.5	49.4	66.6	58	85.4	193	154	103	122	203	174	226	211
South Africa	ETD/GDP	0.96	1.17	1.53	1.42	1.85	1.84	1.39	1.07	0.92	0.62	0.67	0.63	0.64	1.17
	ETD/XGS	2.71	4.14	5.77	5.75	7.27	5.87	4.56	3.54	3.16	2.32	2.78	2.91	2.98	5.22
	ETD/GNI	0.96	1.17	1.53	1.42	1.85	1.84	1.39	1.07	0.92	0.62	0.67	0.63	0.64	1.17
Tanzania	ETD/GDP	102	97.1	91.9	111	128	142	108	107	118	132	151	132	145	159
	ETD/XGS	775	795	1075	1388	1420	2094	1121	1195	1221	1165	1199	1288	1164	883
	ETD/GNI									122	138	158	137	151	165
Togo	ETD/GDP	98.8	104	116	120	112	123	100	98.9	88.6	86.9	78.6	84.3	79.9	105
	ETD/XGS	193	226	231	263	220	253	228	239	203	219	235	252	297	430
	ETD/GNI	102	109	122	127	119	129	105	103	91.9	89.6	80.1	86	81.2	107
Uganda	ETD/GDP	55.5	52.9	40.2	45	29.7	35.2	36.3	30.9	29.8	41.6	60.5	84.4	103	94.8
	ETD/XGS	285	329	479	520	234	256	283	374	394	523	836	1131	1179	1342
	ETD/GNI	55.8	53.4	40.6	46	30.1	35.7	36.7	31.1	30.1	42.1	61.6	85.9	107	96.3
Zambia	ETD/GDP	83.5	89.9	94.5	113	138	199	338	286	180	164	210	206	211	198
	ETD/XGS	202	314	341	343	393	547	803	725	539	612	585	595	578	589
	ETD/GNI	90.3	92.5	101	122	154	226	415	337	202	183	230	233	234	215
Zimbabwe	ETD/GDP	11.8	15.7	21.9	28.2	34.3	42.8	42.2	42.8	34.5	34	37.3	40.2	61.1	64.7
	ETD/XGS	50.3	81	129	172	167	193	175	178	145	146	163	168	224	211
	ETD/GNI	50.3	81	129	172	167	193	175	178	145	146	163	168	224	211

Table A1 (*Continued*)

Country	Debt indicator	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Malawi	ETD/GDP	171	160	101	83.5	139	154	155	151	108	128	131	111	27.6	23.3	22.6
	ETD/XGS	577	527	444	391	425	551	606	538	318	428	523	570	147	104	100
	ETD/GNI	177	166	103	84.8	143	158	158	154	110	130	133	113	27.9	23.5	23.8
Mali	ETD/GDP	153	120	115	127	123	124	123	111	84.6	71.4	68.1	60.7	28	29	25.1
	ETD/XGS	664	568	573	488	498	470	459	332	265	270	268	237	87.2	106	
	ETD/GNI	155	122	117	130	126	127	124	118	91.1	74.1	71.2	63.9	30	27.9	24.4
Mozambique	ETD/GDP	336	332	238	203	197	162	171	120	120	83.2	83.9	67.9	41.3	37.4	34.9
	ETD/XGS	2389	2128	1610	1523	1610	1233	974	485	432	286	267	209	104	101	105
	ETD/GNI	369	361	251	214	208	170	181	130	125	87.5	83.2	68	41.9	39.6	37.4
Nigeria	ETD/GDP	140	121	89	78.5	94.2	83.8	68.2	64.7	51.6	51.2	43	19.6	5.2	5.24	5.42
	ETD/XGS	335	274	185	175	281	227	126	150	162	120	97.8	42.2	12.1	12.8	13
	ETD/GNI	155	132	95	83.7	103	87.5	77.9	70.4	57.8	57.7	48.4	22.3	5.4	5.6	5.9
Senegal	ETD/GDP	95.4	80.3	74.7	81.5	81	77	77.2	75.3	77.1	64	49.1	44.5	20.5	22.9	21.6
	ETD/XGS	300	260	277	298	292	275	276	262	270	240	186	165	80.2	90.2	86.3
	ETD/GNI	99	82.9	75.8	82.7	81.9	78.4	78.7	76.5		64.8	49.4	45.1	20.5	22.7	21.5
Sierra Leone	ETD/GDP	168	140	129	138	190	188	187	150	145	153	149	124	89	18.8	19.9
	ETD/XGS	568	752	722	987	1175	1507	1035	933	824	661	659	527	357	90.3	122
	ETD/GNI	192	149	133	140	201	195	193	154	150	159	157	131	92.8	19.2	20.8
South Africa	ETD/GDP	1.67	1.75	2.31	2.21	2.13	2.46	3.37	6.53	6.83	5.76	4.6	4.45	4.6	3.51	3.77
	ETD/XGS	7.56	7.7	9.33	8.98	8.32	9.71	12.1	21.7	20.7	20.5	17.2	16.3	15.5	11.2	10.7
	ETD/GNI	1.67	1.75	2.31	2.21	2.13	2.46	3.37	6.53	6.83	5.76	4.6	4.45	4.6	3.51	3.77
Tanzania	ETD/GDP	160	140	113	92.4	89.5	90.9	78.6	68.4	72.5	70.5	75.4	58.9	28.1	29.6	29
	ETD/XGS	776	582	566	570	616	611	467	429	434	359	337	281	130		
	ETD/GNI	166	144	115	93.9	90.6	92	79.7	69.1	74.1	71.8	76.9	59.7	28.4	29.9	28.9
Togo	ETD/GDP	148	113	102	89.8	92.7	96.6	108	106	107	97.4	89	79.9	80.9	79.2	54.3
	ETD/XGS	485	347	305	310	312	335	350	335	318	288	265	198	191	189	
	ETD/GNI	156	117	103	91.5	94.1	99.1	110	108	109	98.7	89.7	81	82	79.4	56.6
Uganda	ETD/GDP	85.1	62.7	61.4	62.3	59.9	58.3	56.5	63.9	64.4	71.6	56	49.1	12.7	13.1	15.7
	ETD/XGS	974	532	513	467	621	476	530	555	575	629	440	346	83	78.3	100
	ETD/GNI	86.5	63.3	61.9	62.5	59.9	58.4	57.5	65.1	65.7	72.9	56.9	50.4	13	13.8	15.9
Zambia	ETD/GDP	203	200	216	170	212	187	177	168	177	155	137	75.1	21.3	24.1	20.9
	ETD/XGS	565	555	689	565	789	687	652	598	639	541	358	217	55.3	57.4	56.7
	ETD/GNI	219	215	230	182	228	197	186	176	185	160	148	79.5	23.9	27.6	22.4
Zimbabwe	ETD/GDP	65.1	70.2	58.3	57.9	75.8	72.5	51.7	35	17.8	60.6	102	124	89.9	119	120
	ETD/XGS	188	183	161	154	175	156	144	152	193	242	239	219			
	ETD/GNI	188	183	161	154	175	156	144	152	193	242	239	219			

With the exception of South Africa's debt data, the source of data is World Bank, World Development Indicators 2010 Online Database and IFS online database. The source of South Africa's debt data is the Reserve Bank website. ETD is External Debt Stock, GDP is Gross Domestic Product and XGS is Exports of Goods and Services.

Table A2
Summary statistics.

Regions	Statistic	Relative interest rate	Inflation	Legal	Political	Debt to GDP ratio	Short-term debt to reserves ratio	Exports to GDP ratio	Consumption imports to GDP Ratio	Growth rate of GDP	Log of imported investments	Terms of trade	Log of consumption	Log of exchange rate
Africa	Mean	0.499	0.448	−0.724	−0.674	0.911	0.021	0.301	0.387	3.282	8.862	1.136	8.995	1.089
	Standard deviation	0.331	2.640	0.578	0.581	1.401	1.067	0.166	0.228	6.717	0.621	0.790	1.779	2.183
	Skewness	1.194	12.218	−0.676	−0.360	7.333	−0.115	1.007	2.486	−0.949	0.151	3.671	−3.749	−2.044
	Kurtosis	5.033	17.636	2.875	2.487	74.740	5.058	3.781	11.327	13.515	3.579	20.979	17.307	9.192
	Observations	925	787	336	336	923	838	910	910	897	897	693	876	913
Latin America	Mean	0.377	1.168	−0.104	−0.068	0.473	−0.161	0.209	0.208	3.206	9.916	1.118	10.442	−0.105
	Standard deviation	0.309	5.376	0.680	0.593	0.274	0.457	0.274	0.119	4.751	0.707	0.388	0.673	2.597
	Skewness	1.772	9.460	0.455	0.264	1.625	−2.466	1.625	1.167	−0.517	−0.063	1.202	0.061	−1.279
	Kurtosis	7.531	17.797	3.336	2.137	6.756	21.879	6.756	5.085	4.025	2.358	5.119	2.372	4.621
	Observations	280	349	140	140	400	396	400	400	400	377	300	393	383
East Asia	Mean	0.696	0.080	0.061	−0.111	0.529	−0.264	0.419	0.414	5.894	10.251	0.833	10.586	2.056
	Standard deviation	0.252	0.079	0.521	0.500	0.455	0.409	0.242	0.210	3.732	0.554	0.185	0.499	1.222
	Skewness	0.387	2.865	0.075	0.124	3.917	0.490	1.467	1.164	−1.770	−0.056	−0.530	−0.056	0.228
	Kurtosis	2.486	14.798	1.614	1.779	23.056	3.213	4.823	3.525	8.500	2.779	3.226	2.592	1.796
	Observations	182	214	84	84	185	175	224	224	225	208	180	221	224

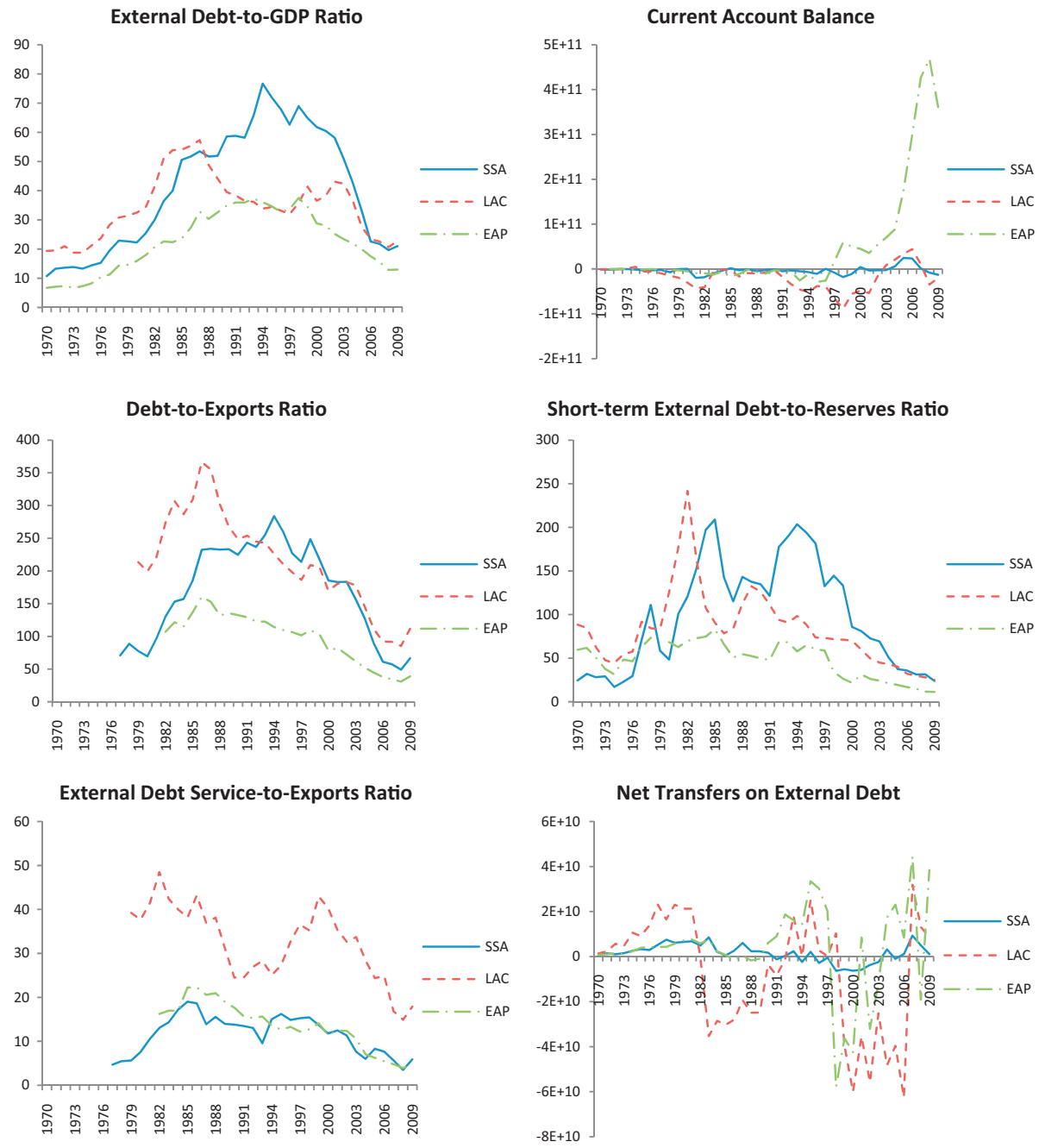

Fig. A1. Comparative external debt indicators for Sub-Saharan Africa, Latin America and East Asia. SSA is Sub-Saharan Africa, LAC is Latin American Countries and EAP is East Asia and Pacific countries.

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